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PROJECT MODELS--MAXIMIZING OPPORTUNITIES FOR DEVELOPMENT AND EXPERIMENTATION IN LEARNING IN THE SCHOOLS.

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THIS REPORT OF A SYMPOSIUM PRESENTED AT THE CHICAGO AREA CONVENTION IN FEBRUARY 1966 OUTLINES PROJECT 'MODELS', A NOVEL PROGRAM DESIGNED TO 'MAXIMIZE OPPORTUNITIES FOR DEVELOPMENT AND EXPERIMENTATION OF LEARNING IN THE SCHOOLS.' THE INTRODUCTION RELATED THE NEED FOR NEW APPROACHES TO IMPROVING EDUCATION THROUGH RESEARCH TO THE EMERGING CONCEPT OF THE RESEARCH AND DEVELOPMENT CENTERS PROGRAM OF THE USOE. PROJECT 'MODELS' WAS DESCRIBED AS A COOPERATIVE VENTURE DESIGNED TO PRODUCE MORE EFFICIENT PUPIL LEARNING THROUGH RESEARCH AND DEVELOPMENT CARRIED OUT DIRECTLY IN THE LOCAL SCHOOLS. A CENTRAL FEATURE OF PROJECT 'MODELS' WAS THE RESEARCH AND INSTRUCTION UNIT WHICH COMPRISED SEVERAL TEACHERS WHO WORKED TOGETHER WITH A LEARNING SPECIALIST, ALSO A TEACHER. THE LEARNING SPECIALIST ASSUMED LEADERSHIP AND WAS ACCOUNTABLE TO THE BUILDING PRINCIPAL FOR THE PROGRESS OF STUDENTS IN THE UNIT AND ACTED AS LIAISON TO THE RESEARCH AND DEVELOPMENT CENTER AT THE UNIVERSITY OF WISCONSIN. SPECIFIC MODELS WERE ALSO DEPICTED FOR EFFECTING PLANNED EDUCATIONAL CHANGE. (JM)

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Occasional Paper No. 3

PROJECT MODELS:

MAXIMIZING OPPORTUNITIES FOR DEVELOPMENT AND EXPERIMENTATION IN LEARNING IN THE SCHOOLS

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PREFACE

The R & D Center for Learning and Re-Education has a four-step plan of operations in achieving its primary goal of improving efficiency of learning in children and youth: (1) Extending knowledge about variables associated with school learning through research, (2) focusing knowledge on three main problem areas, (3) developing products based on research to achieve solutions to the problems, and (4) installing and field testing the products prior to making them available for national adoption. One of the problem areas is inventing and refining models for experimentation in the schools, models of planned educational change, and the like.

This occasional report is based on a symposium presented at the AREA Convention in Chicago in February, 1966. In this report Project MODELS is outlined, a novel program of the R & D Center at the University of Wisconsin that is designed to Maximize Opportunities for Development and Experimentation in Learning in the Schools. In the Introduction, Professor Warren G. Findley, who served as chairman of the symposium, relates the need for new approaches to improving education through research to the emerging concept of the Research and Development Centers Program of the U. S. Office of Education. Professor Herbert J. Klausmeier, who organized the symposium and also initiated the concepts of Research and Instruction Units in local schools, learning specialists, and other concepts central to Project MODELS, gives the origin and rationale of the project. (Mrs. Doris Cook, research associate, was the chief executor of many of the ideas.) William Goodwin, who designed the experiments in the first R & I Units and coined the phrase Project MODELS, describes the sophisticated research that is possible in R & I Units. John Prasch, under whose leadership the Racine Unified School District provides continuous opportunity for research and development, discusses how R & I Units may contribute to the solution of local educational problems. Professor Max R. Goodson, who initially consulted with the staff of Project MODELS, describes a separate but related project which will investigate the process of change that occurs with the introduction of new systems and structures into the schools.

This report was prepared at the time Project MODELS was being started. Field testing will proceed during 1966-1967 and in the following year or two. A national conference is planned by the Research and Development Center in April, 1967, at which time Project MODELS and other ideas and products that have been field tested will be reported fully.

Debbie Stewart
Project Assistant, Information Services

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INTRODUCTION

Warren G. Findley
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The program of this symposium addresses itself to a topic that is very old in one sense, but suddenly new in another. All on this panel and many others have labored long in the effort to conduct meaningful, directly useful research within the great enterprise of public education in the United States. Such research has made its contribution in an atmosphere that supported the aims of the investigator modestly. A few major studies, many minor ones, and a great deal of what has now come to be dignified by the name of action research have guided school operations in uncertain degree. Now, in a period of ten years, educational research has blossomed and attained a status in which substantial organized support is given through public funds. Much is expected of research and research is demanding much of itself.

A persisting problem has been to maintain standards of rigor in research where the demands of the moment have often seemed not only to dictate action before research was ready, but also to assert that day-to-day operational requirements must take precedence over the concern of the research investigator to control confounding influences inimical to clearcut findings. The problem has been intensified by the growing demand for "action now" expressed in the form of all types of subsidies to educational operations from Project Headstart to programs for "senior citizens," from specific programs of training and support to broad programs for supplementary educational facilities to serve all, often without any provision for objective systematic evaluation of their effectiveness.

The Research and Development Centers, sponsored by the United States Office of Education as an extension of its well managed and widely accepted Cooperative Research Program, embody the several interacting elements in this dialogue between research requirements and operational imperatives. Each of the centers, like our own Georgia Research and Development Center in Educational Stimulation, for children aged 3 through 12, is committed to concern itself not only with research and curriculum development, but with field testing in ongoing school situations and dissemination of effective practices through operation of demonstration programs.

I, for one, welcome the confrontation for I have felt for some time the limitations in our standard research approaches. The controlled experiment, adapted from the natural sciences by way of psychology, leaves much to be desired in coping with the "organized complexities" which are our schools and school situations. Confrontation promises to teach us the proper combination of respect and disrespect for such methods. The research of Heil and his associates into what makes for good teaching is instructive here. Their report restates the problem to read, "What kind of teacher is best for teaching what kind of children what sort of subject at what age-grade level?" It has always seemed to me that the debate over the best organizational pattern for elementary schools needs to be rephrased similarly to ask, "What pattern of arrangements takes best advantage of the specialized capabilities and teaching preferences of the faculty of a particular school at each age-grade level?" Ever so often, what seems to have to be resolved by administrative judgment is a problem in which the standard research solution fails to incorporate the total set of variables involved into a design for decision or action. At the risk of making too pat an analogy, it would seem we are trying to solve problems by arithmetic, where algebra or calculus would be more appropriate.

Another issue, or perhaps another facet of the same issue, is the one posed by a systems

approach. Let me quote from Silberman and Carter's contribution at the Conference on New Approaches to Individualizing Instruction, sponsored by Educational Testing Service last May on the occasion of dedicating a building to that grand old man of educational research, Ben D. Wood. Under the title "The Systems Approach, Technology, and the School," they remark that—

> As our work has progressed, we have become convinced that formal hypothesis testing studies of educational innovations are, by themselves, inadequate. Traditional experimental methods have a proper place in an educational research program but they must be integrated into a larger framework which leans heavily on a more cut-and-try, iterative engineering approach.

Elsewhere they state at greater length that

> ...research <u>per se</u> does not result in the development of instructional products. Researchers produce reports and journal articles rather than viable well-engineered educational products. The researcher often holds the belief that he has completed his responsibility in translating research findings into practice when he disseminates information on his research. If the effectiveness of instruction were proportional to the volume and rate of new research papers, there would not be an instructional problem. Unfortunately, research and educational innovation are far from synonymous. Nor can the educational researcher claim credit for recent instructional innovations. The moving of advanced topics down to earlier grade levels and the new curricular materials are the products of the subject-matter scholar rather than the educational researcher. If research is to gain status in the educational world, the researcher will have to leave his theoretically satisfying areas and start working on successive experimental revisions of some instructional product.

Add to the above the varied issues arising from what is coming to be called by some "human experimentation," and there is much to be controlled or avoided.

Toward the resolution of these and related issues, the Wisconsin Research and Development Center for Learning and Re-education proposes its operational concept of a learning specialist working in an experimental Research and Instruction Unit. We do well to ponder this construct which has emerged from their consideration of the factors involved in reconciling and promoting the interactive interests of research and instruction in the schools.

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PROJECT MODELS: ITS INCEPTION AND RATIONALE

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The goal of the R & D Center of Wisconsin, started on September 1, 1964, is to secure efficient learning of children, youth, and adults and simultaneously encourage optimal personality development. The primary emphasis is on learning in the cognitive domain, rather than in the affective or psychomotor domain. To clarify this point, no research and development activity has as its sole or main focus physical growth, motor skill learning, communication disabilities, emotional disorders, or social development. In the cognitive domain, concept learning, problem solving, and related cognitive abilities receive primary attention. Motivation for learning is of major importance.

PROJECT MODELS IN THE CENTER PLAN

The program plan of the Center follows a four-step sequence as outlined in the accompanying Detailed Program Plan of the Center. Experts in various curriculum and subject matter disciplines, behavioral scientists, communication specialists, and representatives of local school systems and the State Department of Public Instruction engage in one or more activities related to the four-step sequence. A brief description of the main activities related to each of the four operations in the plan indicates the role of Project MODELS in the Center.

Extend knowledge about the primary variables associated with efficiency of school learning

Seven groups of primary variables that are closely related to efficiency of learning are the focal points of basic research in the Center. Knowledge about these variables is extended by systematizing present knowledge and by discovering new knowledge through research. The amount of activity thus far devoted to the seven groups of primary variables is in this order: conditions and processes of learning, characteristics and behaviors of children and youth, subject matter content and sequence, instructional material and media, characteristics of the instructional group and organization for instruction, forces outside the classroom setting, and instructional methods and teacher behavior.

Focus knowledge about the variables and their relationships upon problem areas

Three main problem areas have been identified. One is the development of exemplary instructional systems and procedures for the continuous improvement of the systems. The focus here is upon concept learning and cognitive abilities related to various subject fields —mathematics, language arts, science, and social studies—at various school levels. Attention is given to culturally disadvantaged children and adults as groups, as well as to the school population generally. A second problem area is the translation of knowledge from research into learning theory on the one hand and into the technology of instruction on the other. Behavioral scientists are devoting much energy to this problem. A third problem area is the invention of new models for school experimentation, field testing, and installing and maintaining improvements in the schools as will be described more fully later.

Develop, or identify, appropriate instructional products

Translating knowledge about the variables and relationships among them into usable, testable products in the schools is a principal

Detailed Program Plan of the R & D Center for Learning & Re-education

I.
Extend knowledge about primary variables associated with efficiency of school learning

Systematize present knowledge and conduct research to discover new knowledge related to 7 groups of variables and their relationships:

1. Conditions and processes of learning
2. Characteristics and behaviors of children and youth
3. Subject matter content, organization, and sequence
4. Instructional media and materials
5. Characteristics of the instructional group and organization for instruction
6. Instructional methods and teacher behaviors
7. Forces outside the classroom

II.
Focus knowledge about the variables upon problem areas

Focus knowledge upon 3 primary problem areas:

1. *Exemplary Instructional Systems.* Defining exemplary instructional systems and procedures for their continuous improvement starting with concept learning and cognitive skills in mathematics, science, language arts, and social studies at various school levels
2. *Learning Theory and Instructional Technology.* Translating knowledge from research into the science of human learning and behavior on the one hand and into the technology of instruction on the other
3. *Invention and Refinement of Models.* Inventing new models for school experimentation and for field testing, installing and maintaining educational improvements in the schools

III.
Develop or identify appropriate instructional materials, procedures, etc.

This sequence is followed in development:

1. Identify objectives
2. Develop program, material, procedures, etc.
3. Try out with a few clients
4. Produce and try out measurement tools and evaluation procedures

IV.
Install, test, and revise the materials, procedures, etc.

This sequence is followed in installing, testing, and revising:

1. Install the product in one or two settings to assure its feasibility
2. Conduct small-scale controlled experimentation or field testing followed with revision
3. Replicate experiments or small-scale field testing in other settings
4. Conduct large-scale field testing
5. Make product available for adoption nationally

V.
GOAL OF CENTER

SECURE EFFICIENT LEARNING OF CHILDREN, YOUTH, AND ADULTS IN THE COGNITIVE DOMAIN, PARTICULARLY CONCEPT LEARNING, PROBLEM SOLVING AND RELATED COGNITIVE ABILITIES, AND SIMULTANEOUSLY ENCOURAGE OPTIMAL PERSONALITY DEVELOPMENT

activity of the Center. Products is defined to include materials, equipment, procedures, organizations, and total systems. The sequence in the development of materials and procedures up to the first testing in the school progresses as shown in the Detailed Program Plan of the Center.

Install, test and revise the product

This operation extends from installing the product in one or two settings for the purpose of assuring its feasibility, through large-scale field testing, and finally making the product available for adoption nationally. By September 1, 1967, it is anticipated that large programs will have been field tested and will be ready for national adoption.

INCEPTION OF R & I UNITS AND PROJECT MODELS

During the school year of 1964-1965, representatives of 13 school systems, the State Department of Public Instruction, and the R & D Center met intermittently as the Schools Planning Group of the Center. Two main items were dealt with during the year. The first consideration was the establishment of an organization within each school system which would identify significant research problems and promising innovations of the system. The second concern was the actual identification of these problems and innovations. Certain problems were identified which might be partially solved in a one- or two-day seminar. Others could be handled through research of one or two semesters in duration. A third type of problem might require long-term experimentation.

In the summer of 1965 the writer concluded, undoubtedly as a number of others had, that a new type of organization was needed in the school building to deal with some of the mutual concerns of the Center, the school systems, and the State Department of Public Instruction regarding the development of exemplary instructional systems and sophisticated experimentation. This new organization was eventually designated the Research and Instruction Unit (R & I Unit). Project MODELS is the term given to the large-scale research and development program for Maximizing Opportunities for Development and Experimentation in Learning in the Schools. Project MODELS encompasses a program of research and development in learning in the schools; the invention, development, and testing of the concept of R & I Units; the invention, refinement, and testing of a new role in the R & I Unit, designated learning specialist; and the invention, development, and maintenance of new organizations involving personnel of the cooperating schools, the R & D Center, and the State Department of Public Instruction.

Composition of an R & I Unit

The roles and responsibilities of the instructional personnel in the R & I Units require definition at the outset. Each R & I Unit is headed by a learning specialist who assumes leadership and is accountable to the building principal for the learning efficiency of the students in the Unit and for the coordination of instructional and research activities of the Unit. The learning specialist also acts as the liaison between his Unit and the building principal, the staff of the central administration, other R & I Units, R & D Center staff, and parents.

The other staff members of the R & I Unit are two or more certified teachers and one or more non-certified instructional personnel, full- or part-time. The number of students in the Unit varies according to the number of staff members and must be carefully proportioned so that efficient instruction can be carried on in the classroom while the learning specialist and at least one other staff member are in conference. For example, if a Unit includes the learning specialist and three certified teachers, each may work simultaneously with a group of students, or two teachers may provide instruction for all students while the learning specialist meets with the third teacher. The instructional schedule allows the learning specialist to work directly with the students for half of his time and to be available for consultation or planning sessions for the remainder.

Functions of an R & I Unit

The R & I Unit has the same instructional functions as any other organization for instruction, namely, to promote efficient pupil learning. More vigorously than would be expected in the usual classroom teaching situation, the R & I Unit attempts to get each child to learn as fast and as well as he can, to remember what he learns, and to use it in achieving individually and socially useful goals. Further, an attempt is made to develop an exemplary instructional system in each Unit. This system is not limited to the usual subject matter fields,

but includes all the objectives of education and all the groups of variables that may affect efficient learning. An exemplary instructional system is developed by identifying the objectives, ascertaining the capabilities of the students, planning an appropriate instructional program, evaluating the results, and using the results to improve the system.

Besides instruction, the R & I Unit has research, development, innovation, and diffusion functions and capabilities which set it off sharply from any structure now existing in the schools. The R & I Unit provides a unique organization to carry out controlled experimentation on any element of an instructional program, such as content, methods, material, and media. It is also the unit within the school in which to conduct research concerning a total exemplary instructional system—all the variables associated with subject matter, students, instructional staff, characteristics of the instructional group, instructional methods and learning procedures, media and materials of instruction, neighborhood and home conditions, and services within a school system. Early research problems in R & I Units are identified cooperatively by R & D personnel and school people. R & D personnel then assume primary responsibility for designing the experiments, aiding in the specification of treatments, constructing measuring tools, analyzing data, and the like. Potentially, the R & I Unit provides the structure whereby the school system may become autonomous in identifying and researching its less complex but significant research problems related to the improvement of learning and teaching.

The R & I Unit also has developmental functions. For example, materials of instruction must be produced, modified, or refined. Effective motivational and teaching procedures need to be developed. Instructional goals appropriate for specific children are required. These illustrate the types of activities which can be developed effectively within an R & I Unit.

Schools are being deluged with suggestions for innovation. New textbook and unit materials are being proposed in nearly all subjects. Increasingly, the new curriculum proposals involve substantial expenditures of money when introduced throughout a system. Many innovations require teaching skills that only a few teachers possess. In addition, new materials and ideas cannot be tried out effectively unless they can be evaluated. R & I Units within a school system serve as a facility for installing and evaluating promising practices and materials before widespread innovation throughout a system is attempted. For example, after an innovation is found to work well in a few R & I Units, it can be tried in several regular classroom situations. If it works well in these also, it may be ready for system-wide adoption.

Schools have not been able to diffuse promising practices effectively among their own teaching staff. The R & I Unit might become a demonstration unit for certain practices. Also, the learning specialist may explain new practices to other teachers in the building and school systems.

Other forms of R & I Units

The preceding discussion applies to R & I Units that are particularly adaptable to the elementary school. Here 50 to 105 pupils, two or three certified teachers, a learning specialist, and a non-certified person are in the Unit.

The R & D Center, however, is committed to improvement of learning at all levels. Many variations in R & I Units are possible and perhaps essential. For example, in secondary schools R & I Units might be organized vertically in one subject field or across subject fields at the same grade level. As an illustration, one junior high school has a Unit in the seventh grade in which a learning specialist, an English teacher, a social studies teacher, and a remedial reading teacher provide one-half day instruction to about 50 culturally disadvantaged children. They are responsible for the total instructional program of the culturally disadvantaged seventh-graders in language arts and social studies. The learning specialist and the remedial reading teacher also work with the twenty-one other teachers in the school to relate the instructional program for the disadvantaged, especially in reading, to the total program. At the same time, a social worker works closely with the R & I Unit staff and the families of the children, while a guidance specialist works closely with the children. The learning specialist, the teachers in the R & I Unit, the social worker, and the guidance specialist meet regularly during the week. The learning specialist and the teachers also meet frequently as a group.

NEW ROLES AND RELATIONSHIPS

From the previous outline of functions of an R & I Unit, four related considerations are apparent. The main responsibilities of the learning specialist in instruction, research, development, innovation, and diffusion must be

clarified. Second, certain capabilities and characteristics are desired of the learning specialist. Third, new relationships with the building principal and certified personnel in the Unit are demanded. Finally, a new organization among R & I Units and other personnel within a school system may be necessary. Each of these is outlined briefly, not as a set of final conclusions, but as emerging, spiraling concepts being developed by the Center staff and school people.

Responsibilities of the Learning Specialist

The learning specialist has responsibility related to all the functions of an R & I Unit, namely, instruction, research, development, innovation, and diffusion.

A. Instruction

1. Assume leadership in developing, executing, and evaluating an exemplary instructional program in the Unit, including objectives, materials, equipment, and activities. Here the learning specialist works closely with available subject matter specialists, the building principal, and others. The learning specialist is administratively responsible to the building principal.

2. Coordinate the diagnosis of learning problems of children and the development of appropriate individualized programs, so that each student learns well and simultaneously develops a buoyant and healthy personality. School psychologists, guidance workers, and others contribute to this area of concern.

3. Assume leadership in initiating, establishing, and maintaining good home-school relations. Social workers, and other specialists as available, can contribute as effectively or more effectively than when working with single teachers.

4. Teach about half-time, or in other ways be directly involved with the children.

5. Utilize a portion of the remaining half-time (a) to act as liaison between the building principal or staff and teachers (and students) in his Unit; (b) to meet with staff members in the Unit to plan instruction and to enhance the understanding of, and direction given to, individual pupils; and (c) to meet with other learning specialists.

B. Research

1. Plan research activities in the R & I Unit with appropriate personnel from the Unit, the building, the central staff, and the R & D Center.

2. Coordinate the execution of research within the R & I Unit.

3. Guide the administration of experimental treatments—instructional methods, material, media—by sub-experimenters (teachers or others) to insure continuous adherence to the specified experimental design and to a schedule for collecting information.

4. Participate in the collection and, as time permits, the analysis of information collected.

C. Development

1. Plan the development activities with members of his Unit, the school staff, and the Center.

2. Coordinate the development of an exemplary instructional system within his Unit, including a statement of objectives, the assessment of the capabilities of students, the instructional program, and evaluation procedures.

3. Participate directly in preparing instructional materials, measurement instruments, etc.

D. Innovation

1. Coordinate the introduction of novel procedures and materials, particularly in connection with the development of an exemplary instructional system.

2. Stimulate the invention of new instructional procedures within the Unit.

3. Keep abreast of innovations throughout the school system, the state, and nation through visits, conferences, and reading.

E. Diffusion

1. Provide for the proper briefing of observers of the R & I Unit.

2. Participate in the planning and actual diffusion of promising practices within the school building and within the system as appropriate.

Desired Capabilities and Characteristics of the Learning Specialist

Later it will be indicated that learning specialists as a group should receive higher salaries than do teachers as a group. Building principals already do, while non-certified personnel properly receive lower stipends than teachers. Further, there should be differences in pay among learning specialists, based primarily on performance. The learning specialist should receive a higher salary because he earns it through meeting expanded professional

responsibilities of the type previously outlined. Also, he knows more about research, development, and the groups of variables associated with efficient learning and teaching than do teachers in the Unit. Further, the learning specialist works more hours per week and more weeks per year. Although no different certification is contemplated until more experience with R & I Units is obtained, the learning specialist should be selected carefully in terms of the desired capabilities and characteristics next enumerated. It should be apparent also that the learning specialist must continually improve his professional capabilities by pursuing further education and gaining relevant experience during the school year and summer. Many teachers who are committed to a career of teaching (this is only a small percentage of the national total) could qualify as learning specialists if they desired to assume the additional responsibilities, if they were willing to work eleven of twelve months each year, and if they continuously and systematically extended their knowledge and capabilities. Eleven requirements should be considered in the initial selection of learning specialists:

1. Teacher certification.
2. Three or more years of successful teaching experience.
3. Graduate degree, or progress toward one for beginning specialists.
4. Graduate training in the area of learning and research.
5. Commitment to a career in education.
6. Positive attitude toward research.
7. Flexibility and inventiveness in the adaptation of learning methods, materials, and procedures to experimental situations.
8. Ability to exercise leadership in a close and extended interpersonal situation.
9. Ability to draw upon the resources of other members in the R & I Unit.
10. Ability to maintain effective interaction with other teachers in the Unit, the school principal, children, parents, research personnel, and liaison personnel.
11. Sensitivity to individual learning problems and training in methods of alleviating them.

Relationship of the Learning Specialist with the Building Principal and Certified Personnel in the Unit

R & I Units in a school building neither lessen nor increase the building principal's responsibility toward the instructional program and other educational functions performed in the school building. However, R & I Units in the building should facilitate improvement of instruction in that learning specialists, by the nature of their capabilities and the organization of R & I Units, can make a more substantial contribution than can a regular teacher with a full-time instructional role. Further, the learning specialist and Unit organization in no way decrease the professional contribution of teachers or non-certified personnel. The instructional program can be organized to utilize the strengths of each teacher to the fullest. The R & I Unit requires no less of the teacher than does a regular assignment. However, the teachers—beginning teachers as well as those who prefer to work no more than forty hours per week and ten months per year—are not required to make judgments about children, materials, procedures, etc. with little or no information. The learning specialist organizes the Unit and secures available resources so that better judgments are made. In order for the learning specialist to function properly, relationships of the type now enumerated are essential:

A. With the Building Principal

1. The learning specialist is administratively responsible to the building principal.

2. The building principal participates in the planning of research and instruction that takes place in the R & I Units within his school.

3. The building principal meets with the learning specialist on such matters as he (the principal) designates, e.g., for discussion about particular teachers, non-certified personnel, or students within the R & I Unit.

B. With the R & I Unit Personnel

1. The learning specialist is responsible for the coordination of activities of the certified and non-certified personnel in the R & I Unit.

2. The learning specialist and all the teachers meet together as often as necessary, and no less than once per week, to discuss and plan instruction and research and to consider the work and needs of individual pupils. The teachers in the Unit are assisted by the learning specialist in developing solutions to learning difficulties of students.

3. The teachers in the R & I Unit demonstrate favorable attitudes toward research so that they conscientiously undertake the application of experimental treatments and execute the collection of information.

4. With the inclusion of a half-time secre-

tary in the R & I Unit, the teachers have more time to pursue professional activities. These might include, but are not limited to, the following: reading in professional journals, assisting in the planning for the research and instruction to be conducted in the Unit, aiding in the evaluation of research projects completed by the Unit, proposing research hypotheses to be considered for inclusion in the Unit's undertakings, and developing curriculum materials and instructional procedures.

5. The teacher should experience considerable growth as a professional person as a result of working in an R & I Unit. However, he will not be expected to exercise the leadership and assume the responsibility of the learning specialist. It is anticipated that the work schedule of the learning specialist will not be controlled by the school day or school week. When after-school and Saturday work is required, the learning specialist will incorporate this into his schedule.

Organization Among Units and Within a System

The broad design of R & I Units has been portrayed. Where more than one Unit exists in a building, the principal might form a committee comprised of himself, the learning specialists, and one or more teachers in order to provide direction and coordination of the instructional and research programs in the Units. The total school system might form a council comprised of members of the central staff, building principals, learning specialists, and teachers to work on instruction and research matters. When this work is performed outside the school day or year, additional pay should be given to any staff member whose salary does not currently provide for this additional responsibility. A state network of school systems with R & I Units might be formed with representatives from the school systems, the State Department of Public Instruction, and the R & D Center. Other colleges and universities might be involved in the network also. Obviously, organization within the school is the responsibility of the local school, and affiliation with the R & D Center and the State Department of Public Instruction in a state network of some type is voluntary.

STARTING THE FIRST UNITS

In August 1965, the first meetings specifically regarding Project MODELS were initiated by representatives of five school systems—Janesville, Madison, Milwaukee, Racine, and West Bend—and the R & D Center. The concept of the R & I Unit appeared to offer an excellent organizational pattern for improving educational programs and conditions of learning, including motivation, for culturally disadvantaged children. Therefore, R & I Units were started in connection with Title I of the Elementary and Secondary Education Act. R & I Units comprise a creative solution to instructional problems for all children, not only the culturally disadvantaged. Therefore, they are being proposed as exemplary innovations to be pursued through planning grants under Title III of the same Act. In addition, the R & D Center and the local schools planned other Units independent of provisions of the Elementary and Secondary Education Act. Seventeen Units were started the second semester, 1965-66, in various buildings of four school systems involving about 1200 elementary and 1000 junior high school students. Controlled experiments were conducted in some of these Units; the main emphasis, however, was on providing excellent instruction. Recently a sixth school system, Manitowoc, joined the Project and will establish its first Units in the fall of 1966. A total of forty Units is planned for September 1966.

Seminars and workshops at the Center and in the local schools were conducted throughout the second semester, 1965-1966, in order to extend the knowledge and improve the capabilities of the learning specialists and other personnel. In addition, an eight-week institute for learning specialists will be offered during the Summer Session 1966 at the University of Wisconsin. Building principals, central staff personnel, and teachers will participate in parts of the institute. A staff member from each of the first five school systems that started R & I Units is employed to assist in the institute. This same staff member will provide leadership in connection with the development and improvement of R & I functions during the coming years in his local school system.

RATIONALE OF PROJECT MODELS

Project MODELS, including the concepts of the R & I Unit and the learning specialist, is being developed for four main reasons. First, new arrangements are needed to carry out more sophisticated research in school settings. Earlier in this century an attempt was made to establish experimental schools which would

set the pace in developing, testing, and disseminating model instructional methods and materials. These schools, however, were also used for student teaching and for observation by prospective teachers. Further, the classes tended to include only those children of average and above average abilities, drawn largely from the middle and upper social classes. This combination of teacher-education function and atypical student population impaired, and at times completely submerged, the research and development functions of most laboratory schools.

In the past, bureaus of educational research were established in large school systems. Most of these bureaus did not mature into effective research organizations. The researcher, housed in the central administrative building, was too far removed from the students in classrooms. Until recently, many large bureaus of educational research were engaged primarily in collecting and summarizing information about teachers and pupils, information which was more useful in categorizing and record-keeping than in the improvement of learning and instruction.

As it is today, the building organization of a principal plus a large number of teachers is not conducive to research and development. Since most teachers are inaccessible to the researcher and other personnel except during out-of-school hours, it is difficult to discuss a research design involving several teachers. Further, it is almost impossible to communicate instructional treatments to several teachers and to insure that they carry out the treatments systematically. R & I Units, in regular buildings of several school systems, are designed to eliminate these shortcomings of laboratory schools, research bureaus, and the usual building organization.

Project MODELS is also being developed so that the local school systems can eventually conduct research on their own problems, initiate and evaluate innovations, and develop and maintain exemplary instructional systems. Many schools have cooperated generously with colleges by supplying subjects to participate in research projects of graduate students, but the schools themselves have not identified the problems to be studied. The Elementary and Secondary Education Act of 1965 provides schools with funds to solve some of their problems, including the development of exemplary instructional systems. The R & I Unit provides an organization whereby a local school system, an institution of higher learning, and a department of public instruction can pool resources in the identification and solution of problems of critical concern to the school. In the foreseeable future, many school systems will exercise considerable autonomy in identifying and solving critical educational problems. Further, the research personnel of the colleges and departments of public instruction can work more effectively with the schools in R & I Units.

A third reason for the development of Project MODELS is based on the need for attracting and keeping permanently a larger number of more competent teachers. The learning specialist position demands great initiative and leadership abilities. It is anticipated that the learning specialist will be employed on a twelve-month basis and will receive a salary for the calendar year well above that of teachers who work only during the academic year. Further, learning specialists should be on a merit basis from the outset, rather than a fixed schedule, making it possible for younger persons with a master's degree to advance quite rapidly and to remain in classroom teaching without experiencing acute financial problems. This combination of role, responsibility, and salary should facilitate the recruitment of a larger number of more able persons; further, many young married men would continue as teachers, rather than quitting permanently or moving into administrative posts for purely financial reasons.

Finally, Project MODELS is being developed to promote long-term research and development activities that are cooperative projects of local schools and colleges. Increasing the efficiency of learning in the schools is a long-term endeavor, one to which attention must be given continuously by personnel from the schools, institutions of higher learning, and departments of public instruction. For example, the development of an exemplary instructional system is not likely to be accomplished in a year, or even five years, through producing a new set of instructional materials. Rather, it is a continuous process that requires research on all the primary variables of the system, including instructional materials. Similarly, sophisticated controlled experimentation is needed through the foreseeable future in order to develop model instructional systems. This means that an institution of higher learning or a state department of public instruction that has considerable human resources must maintain a close and continuing relationship with each R & I Unit.

Many promising programs of the past have failed because personnel from colleges were not willing to commit themselves to research

in the schools. Many educational psychologists are still ignorant of the research opportunities in school settings, compared with the laboratory, or have not been able to work out desirable arrangements with school systems. The desirable arrangements are not likely to materialize until professors are willing to commit themselves to a research program for a period of years, rather than to one short-term project. Previously the need for a greater number of more able young people to enter teaching as a life career was emphasized. The concept of the learning specialist may facilitate this. We also need a far larger number of more able behavioral scientists, curriculum experts, and others to commit themselves to a life career of improving school learning, to give a substantial part of their time, at least half, directly to research and development in school settings. The concept of Project MODELS may facilitate this. R & I Units, to function properly, must have continuous access to university personnel with specialized knowledge and capabilities. The R & D Center is committed to provide this close working relationship with all R & I Units it helps to establish.

II

PROJECT MODELS AND THE CONDUCT OF CONTROLLED EXPERIMENTS IN SCHOOL SETTINGS

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The most unique function of the Research and Instruction Unit (R & I Unit) is its facilitation of controlled research in the school setting. As has been implied, the R & I Unit is the natural setting in which to conduct research on any element of the instructional program or on the total instructional program itself. The problems to be researched in these Units will come from two main sources: problems identified within the school system and problems originating outside the system, quite often originating in an university.

The role that research and experimentation have played in settling educational disagreements, in establishing new techniques as improvements, or in verifying long-standing practices as effective has been minimal. The flurry of experimentation in education in the 1910's and early 1920's produced little tangible evidence of its existence insofar as affecting classroom practices is concerned. The more recent flurry has been caused by the inundation and tempting undulation of federal monies under the Cooperative Research Program; this program has led to the publication of many documents and has even served as a stimulant for a congressional investigation or two, yet its effect on classroom practices has been modest. It is quite possible that some school boards and their superintendents have become disillusioned with permitting research activities in their schools because of the paucity of ideas or other substantial returns that have been implemented in the system's educational practices.

Related to the discussion above is the problem of gaining access to the public schools in order to conduct research. Because of some of the attitudes that developed out of situations such as those described above and because of the increased research monies directly available to the schools themselves under Titles I and III of the Elementary and Secondary Education Act of 1965, the day may be fast approaching when accessibility of the schools to graduate students and professors for short-term research will be drastically curtailed. "Independently wealthy" and hopefully staffed by their own competent researchers, the schools will close their doors to outside interests wanting to tap the school population but unwilling or too shortsighted to carry through and assist the school in implementing any findings. Some persons have predicted that in the near future many schools will not provide subjects for seminar reports and theses of graduate students, the research problems having been generated unrelated to the research needs of the school system. This is already true in many systems, unless the graduate student's father happens to be a superintendent of schools or unless the graduate student himself is the superintendent of schools.

Possibly one reason little knowledge resulting from research has been cranked back into the on-going program is that it was generated on the basis of a very short study. Very little research of a longitudinal nature has been conducted in the schools; even studies of one or two semester's duration are unusual. For example, in the case of my own dissertation, all the data were collected in the schools in one and one-half hours on a single morning; this might represent some type of a record.

The research function of the Research and Instruction Unit has been incorporated in response to some of the undesirable conditions outlined above. The advantages available for conducting controlled experimentation in R & I Units might be enumerated as below.

First, access to the schools is immediate. There is no long search for a suitable school situation, no extended bargaining sessions at the conference table during which both admin-

istrator and researcher parley for a mutually tolerable arrangement, and no series of barriers which must be hurdled, straddled, or circumvented. Instead, with R & I Units, there is only need for a comprehensive meeting in which the research proposal is discussed openly and completely. When the proposal originates outside the school system, the administrator or his designated committee obviously has the right to examine it in detail and the duty to reject it if it is judged detrimental to the school system. The planning for research is constructive, with involved parties serving as facilitators for one another. This type of relationship is possible when there is a history of successful research and mutual trust established.

A second advantage is that feedback to the school system is relevant and immediate. It is relevant because the problem researched was either identified by the system as one of primary importance or, if generated from without the school system, approved by the superintendent as meaningful to the local educational situation. It is immediate because teachers within the Unit are cast in the role of sub-experimenters; that is, they have been directly involved. If a particular treatment, technique, or medium is experimentally found more effective by the R & I Unit, then it can be quickly disseminated to other elements of the system.

A third advantage of the R & I Unit is that research is not a haphazard occurrence. It is a planned, orderly, consistently engaged-in activity. In a word, it is systematic. This aspect of the Research and Instruction Unit makes it even more probable that attention will be given to the long-range research needs of a school system and to the longitudinal investigation of factors affecting efficiency of pupil learning. Research of a longitudinal nature has seldom been conducted in the schools.

The following three advantages seem even more pertinent to an organizational scheme such as the R & I Unit, whereas the first three advantages could be achieved by careful, diligent, persistent researchers operating in schools as they are conventionally organized.

The fourth advantage is essentially the facilitation of salient elements needed for excellent research designs, including randomization. It would seem that a good number of sins are sometimes committed under the blanket of randomization. One is reminded of the story of the researcher speaking to a group of teachers involved with an experiment in the schools. He spent the hour before R-hour (Randomization-hour) explaining the advantages of randomization, the exquisite and aesthetic properties of equating groups by chance. Then, just as he opened the table of random numbers to divide the students into the experimental and control classrooms, Miss Quail, a veteran of 30 years, stated, "I can see that this randomization is a good thing, and I am happy to go along with it. Just so I don't get John Homewood."

In R & I Units, there is a pool of 60 to 100 youngsters. Because of the flexibility in the approach, they may be randomized for any particular experiment. They may be re-randomized at any opportune point without jumbling grade-books, disrupting schedules, etc.

A fifth advantage allows circumvention of one of the most critical problems in classroom experimentation: the teacher variable. Quite obviously teachers are different, and when a teacher administers an experimental treatment, the effects of the teacher and the treatment are hopelessly confounded. To analyze just class means is one solution to this dilemma: that is, consider the entire class production as just one observation. The chief drawback here is the lack of statistical power: to achieve an N of 30 experimental units, 900 children must be involved. Three other alternatives or "solutions" exist in regard to the teacher variable: one extremely poor alternative which is often used (sadly) is to ignore it, pretend it doesn't exist, and analyze the observation on each child as independent. A second alternative is to avoid the teacher variable entirely; programed instruction has been utilized in many experiments because of its obvious advantage in this regard. A third alternative is to have each teacher administer all experimental treatments, each treatment to a different random portion of his class.

In R & I Units, an additional alternative is available. Teachers may be rotated periodically during the experiment. The flexibility of the Unit and the reduced number of pupils per teacher makes this possible. For example, Teacher A may administer Treatment 1 during weeks 1, 4, and 7; Treatment 2 during weeks 2, 5, and 8; and Treatment 3 during weeks 3, 6, and 9. Teachers B and C would have complementary schedules. Order effects would be a consideration in such an arrangement, but probably would not be critical. Of course to control order effects, the teacher-rotation scheme could be established by means of a Latin-square design; thus, pupils would not always experience teachers in the same sequence. Although external generalizability

in the example given is still far from ideal (as only three teachers were involved), it is a considerably more desirable situation than one in which the effect of Teacher A is confounded with Treatment 1, Teacher B with Treatment 2, and Teacher C with Treatment 3. In addition under this proposed arrangement the teacher does not become "emotionally involved" with a particular experimental treatment, a situation that often poses a serious threat to the generalizability of experimental results.

A sixth advantage is inherent in the role and training of the learning specialist. Almost every person who has done research in the schools can cite a few favorite examples of how a teacher, usually well-meaning, either did or nearly did convert and/or subvert the intended experimental treatment. The learning specialist in the R & I Unit has, as one of his primary responsibilities, seeing that the prescribed experimental treatments are religiously followed and implemented. His training will stress the absolute necessity of this. In addition, the nature of the learning specialist's role makes him accessible to the researcher for either planning contemplated research or discussing on-going experiments.

After this extended discussion of advantages, it would be well to remark that certain aspects of Research and Instruction Units could be disadvantageous for research, possibly more so than in traditional approaches to doing research in the schools. In the first place, the great amount of experimentation that might take place in some units could serve to give the pupils the "guinea pig complex." There are ways to guard against this. It would be unwise to have several projects underway at the same time. It also might be unwise to keep the same pupils in a Unit for several consecutive years, although certain instructional advantages might accrue from this procedure. Research activities certainly will neither consume all the energies nor dominate all the activities of the personnel in R & I Units; effective and efficient instruction will be a first and primary consideration.

A second aspect of the R & I Unit that should be monitored because of its potential detrimental effect upon the external validity or generalizability of any research results is not unlike the mirror image of the first danger. Whereas the guinea pig complex might cause negative pupil attitudes, a combination of the novelty and Hawthorne effects could produce positive pupil attitudes that might tend to obscure the true effects of the treatments. It is even conceivable that the pupils in these Units might be so frequently exposed to experimental atmosphere that there would be an accumulated increment accruing to them because of their participation. Paradoxically, many of these Units will be started in schools that have predominantly children from disadvantaged social environments, children who, it has been said, labor under an accumulated decrement, that is, they fall farther behind in school each year. Maybe the best that we can hope for is that the two effects might cancel each other to produce an accumulated zero balance.

Realistically, however, there is much that a researcher can do to prevent such undesirable occurrences. Limiting the number of studies underway in any one Unit is one way to alleviate the situation. Also, frequent rerandomization of students should help; the probability that a single student will always randomly be assigned to the most effective experimental treatment is small. In addition, the researcher can attempt to arrange experimental conditions so they are as non-reactive as possible, that is, so they do not seem an extraordinary bill of fare to the students.

Thus, in all, the R & I Unit offers some unique advantages to the researcher who would like to conduct controlled experiments in the school setting. The types of studies that can be done, and done well, are manifold. The critical elements for conducting creditable controlled experimentation in the schools are random assignment of pupils to treatments, control of the teacher variable, and methodical implementation of the designated treatments. The Research and Instruction Unit makes reasonably accessible all of these critical elements, as well as offering a framework within which to conduct longitudinal research on problems relating to the efficiency of pupil learning.

III

R & I UNITS AND THE SOLUTION OF LOCAL EDUCATIONAL PROBLEMS

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Racine Unified School District No. 1

Project MODELS is a cooperative venture, designed to produce more efficient pupil learning through research and development carried out directly in the local schools. A central feature of Project MODELS is the Research and Instruction Unit (R & I Unit). The Unit comprises several teachers who work together with a learning specialist, also a teacher. The learning specialist assumes leadership and is accountable to the building principal for the progress of students in the Unit but also acts as liaison to the R & D Center. Thus, each R & I Unit in a local school effectively unites the school system, the R & D Center at the University of Wisconsin, and the State Department of Public Instruction in this cooperative venture. Personnel from all three organizations, and others as appropriate, join in the quest for better education of children and youth. Our central staff, building principals, and members of the R & I Units find this new relationship to be both rewarding and stimulating.

Our central staff has always felt that educational research and development are never-ending processes and that the local school must participate and exercise leadership in these matters. We will always need to accrue new knowledge through research. New materials and procedures must be developed continuously to meet changing conditions. The R & I Unit provides the organizational structure for research and development. Indeed it goes farther, by providing not only a vehicle for innovation but also a way in which the results of research can be tried out immediately. In essence, then, the R & I Unit is an organization in which innovation, development, and research can be focused upon securing more efficient pupil learning. This is the primary concern of the local schools as well as the R & D Center.

The first function of an R & I Unit in a school building is to provide excellent instruction for the children in the Unit. In fact, exemplary or model instructional programs should emerge in each Unit, partly because of cooperative effort directed toward this goal. When certified and non-certified personnel function as a unit, teachers have more opportunity to provide a flexible, varied program for the individual student. Some of the advantages of cooperative planning by an R & I Unit are the same as those in team teaching. Included here are the following: teachers can better work together in the selection of curriculum materials for a specific group of children; the individual teacher observes and learns from the other teachers; teachers continuously evaluate each other's work; teachers exchange ideas on a professional basis; excellent utilization and evaluation of instructional materials are possible; innovation of materials and procedures is facilitated; special interests and strengths of each member of the Unit are utilized; appropriate grouping and re-grouping of students can be accomplished and individualization of instruction and pupil assessment are facilitated.

The R & I Unit is a particularly appropriate instructional organization for schools in which there are many culturally disadvantaged children. Here the additional staff member of the Unit assists in the diagnosis of learning problems and also in developing special compensatory programs. Closer home-school relationships are maintained by freeing a staff member for conferences, home visits, and parent education. The learning specialist can coordinate resources of specialized personnel such as subject supervisors, psychologists, and social workers more effectively than can teachers of a self-contained classroom. Equally important, the R & I Unit can function effectively without requiring so much time of

[1] Since the preparation of this paper, Mr. Prasch has been appointed Executive Director of the Upper Midwest Regional Educational Laboratory.

these scarce personnel. Further, since instructional programs for the culturally disadvantaged are necessarily experimental, the R & I Unit is a model organization for innovating and evaluating experimental programs.

Most teachers enjoy and benefit from carrying on instruction together. At the outset, some teachers may fear losing their autonomy. For some of our teachers in R & I Units there was a relatively short period of adjustment, while for others it came about more slowly. In many instances the learning specialist with a keen insight into human relations quickly brought out the best talents of each teacher, thus giving a greater sense of professionalism. It has been rewarding, as a chief school administrator, to see enthusiasm develop so quickly among teachers in the R & I Units, especially in our inner-city schools. The enthusiasm and wholehearted cooperation became evident as a Unit identified a first research activity, specifically designed to improve instruction for the culturally disadvantaged. This leads to my second point, dealing with the research function of the R & I Unit.

There is an acute shortage of research talent; most school districts cannot secure sufficient expert assistance on their own. However, competent leadership given by the Research and Development Center is enabling us to proceed smoothly and systematically. Our own Research and Development Committee works closely with the R & D Center. The ideas generated in this Committee and by others now have a better opportunity to be executed. Planning for research is proceeding more effectively. In several school buildings, research designed to produce exemplary instructional programs, first in the R & I Units and then in the whole school building, is proceeding in an orderly fashion. The best ideas from the teaching staff, building principals, central staff, and R & D Center are going into this planning.

For example, during the second semester, 1965-66, many ideas of our staff regarding regrouping, subject matter content, new instructional materials, new approaches to teaching, and other concerns have been identified. The R & I Units are serving as a primary facility for innovating and evaluating these new approaches. What works out well in a Unit will subsequently be tried out in several other settings. From there the better materials, procedures, or programs may well be adopted as standard practice in the system.

The continuous training provided the learning specialist throughout local in-service programs and the seminars at the R & D Center may eventually enable us to conduct research fairly independently of the R & D Center and other agencies. It will assuredly enable us to use specialized research talent from within and outside the system more effectively. How effectively this is done depends partly on the capabilities which can be developed in the learning specialist.

The staff of the five school buildings in which the first nine R & I Units were installed are excited about the role of the learning specialist. The learning specialist is extending his professional capabilities. After completing an eight-week summer institute at the University which emphasizes research techniques, diagnosis of learning difficulties, motivation, human relations, and curriculum areas, he will be better prepared for his role in the next school year. In addition, each Unit has five or more planning sessions each semester with the building principal, a member of the central staff, and two members of the Research and Development Center. These sessions are fruitful learning experiences for all of the participants and contribute to extending the knowledge and developing new capabilities of the entire instructional staff.

Schools having R & I Units experience some problems, as well as those opportunities already indicated. Some of the problems derive simply from the fact that R & I Units are novel and involve change. Another problem originates from the possibility that the new arrangement increases the cost of instruction. Whether there is an increase in cost depends upon the salaries of the teachers in the Unit, the extent to which noncertified personnel are used, and the number of children in the Unit. A related problem is to find a feasible means for paying the learning specialist a reasonable amount for the greater responsibility he assumes and the additional work he performs. Without stretching the concept of the learning specialist too far, it is possible that once a Unit is functioning well, the learning specialist may work with other teachers in the building during the school year and during the summer months. For example, if there are two Units, one at the primary level and one at the intermediate level in an elementary school, the two learning specialists may provide assistance to beginning teachers and others not in the Unit. Such arrangements would permit additional pay for leadership activity of the type central staff supervisors and building principals perform. Although this might be possible, I wholeheartedly subscribe to the principle that the learn-

ing specialist must know each student in his Unit well and spend at least half time with those students. To make supervisors or assistant principals of learning specialists would be self-defeating.

Even though R & I Units may increase cost of instruction somewhat and result in a new position that is different from that of the building principal and the full-time teacher, the idea of improving learning efficiency of children and youth through a continuous program of research, development, and innovation is sound. We have complete confidence that the eventual payoff in producing better educated citizens is very large. We also know that the R & D Center is already planning an evaluation of R & I Units in terms of achieving the objectives of instruction, research, development, and innovation. We intend to participate fully in this evaluation. Our school system, in harmony with the R & D Center, believes in educational research and development and will abide by the results of the evaluation. Because we are committed to secure the best possible education for children and youth, we want to determine the extent to which R & I Units will contribute toward achieving this goal.

IV

MODELS FOR EFFECTING PLANNED EDUCATIONAL CHANGE

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The R & D Center is investing in three functions for the improvement of education: (1) research, (2) development, and (3) diffusion and utilization. Knowledge gained from investigations and innovative products that are prepared through development, will need to be diffused to schools and utilized by them, if the Center's ultimate mission is to be achieved. It is in providing for powerful, effective utilization of new knowledge, products, and structures that the study of educational change may yield significant results.

RATIONALE FOR ATTENDING TO PLANNED CHANGE

There are two principal categories of educational change. One may be described as natural or evolutionary. This kind occurs in the ordinary course of events as, for example, when new teachers come to the staff of the school or the socio-economic complex of the supporting community changes. The purpose of the present effort, however, is to focus attention primarily upon the second category. This change is initiated by school officials, is deliberately designed, and is purposefully directed. It has resulted from a recognition of the fact that rapid, and often radical, change is required if schools are to become more relevant to the imperative needs of our society. The national effort, as represented in the titles of the Elementary and Secondary Education Act of 1965, is concerned primarily with planned change. As a result, many institutions, projects, and activities are being created through the resources and guidelines of the Act. A national network of institutions is emerging through which coordinated research and development and dissemination activities will facilitate changes in schools.

In the state of Wisconsin, the network is already partially visible and operative. It involves the universities, the State Department of Public Instruction, and the school systems. With the creation of a Regional Laboratory, the network will develop more broadly and more fully for producing educational changes. The Wisconsin Improvement Program of several years standing and achievement has created a climate of readiness for change. Probably because of the existence of this program the Research and Development Center has been able to move rapidly in creating Research and Instruction Units in cooperating schools as reported in the earlier papers.

The project in planned educational change is related to Project MODELS although it has a different emphasis. Project MODELS is concerned with establishing an organization within a small number of school systems, designed to establish and maintain exemplary instructional programs through a continuous program of research, development, and innovation. Research and Instructional Units, headed by learning specialists, are central in Project MODELS. In contrast, Models for Effecting Planned Educational Change, described in this article, has an emphasis on the school system as an organization. It deals with the forces outside of the classroom that have an effect upon the teaching and learning that goes on in the school.

There is certainly nothing new in the proposition that school systems are undergoing change. School officials have become very much aware of change through the professional responsibilities they carry. Likewise, they are concerned with solving the problems related to making educational improvements. The establishment of the Research and Development Center here in Wisconsin and other centers elsewhere, as well as the initiation of Regional Laboratories, will make resources available to

school systems for innovation and improvement in a volume never experienced before. Studying and evaluating the innovations as they become available, and selecting from among them, will require an organized effort. Adaptation and utilization so that a selected innovation becomes effective in the operation of a school system will also require a planned effort.

In response to the prospect of a greater amount of educational change in the near future, the Research and Development Center has initiated this project which, like other projects, will represent a partnership between the Department of Public Instruction, school systems, and the Center.

With a spirit of change beginning to permeate schools, it is important to inquire into innovations and the change process. But it is also important to consider the forces that motivate either a local or national mood making schools receptive to change. Resources for producing change are being developed at a very rapid rate and the implication is clear that they are expected to be used. If not now true, it may be so before long that professional and institutional status will be determined by whether or not personnel "get with" the propensity for change. In spite of the fact that educational change is urgently needed, it is appropriate to be mindful of the wisdom expressed by Whitehead (1963) when he said, "There are two principles inherent in the very nature of things, recurring in some particular embodiments whatever field we explore—the spirit of change and the spirit of conservatism" (p. 289).

The author has stated elsewhere an implication of Whitehead's thought for education in the following: "To develop its program, any school staff should maintain a balance between program stability and program change. This balance shifts in either one direction or the other as community conditions either favor change or promote the conservation of the status quo" (Goodson, 1946, p. 47). A wise thinking that carefully weighs the pros and cons of a proposed innovation is needed today. Although the edge should be given to change in the needed effort to seek for improvements, nevertheless, conservatism in some educational matters may be judged to be the better part of wisdom when a cult of innovation-for-the-sake-of-changing may be on the horizon of American education.

The thesis of this article is that attention needs to be given to ideas regarding change. A bold and imaginative conjecturing is appropriate. In the next section, certain conjectures are advanced, either bold and imaginative or not, that may be sketched as follows:

1. Change and improvement in education
2. Education as caused by several factors
3. Multiple and concurrently applied change efforts are desired
4. The school as an organization
5. The reality of human functioning and relations
6. Necessity of adaptation as a mode of changing
7. The criterion of partly-autonomous and continuing adaptability
8. The cyclical sequencing of critical processes
9. Educational improvement requires a partnership of institutions

MAJOR IDEAS FOR CONJECTURING ABOUT EDUCATIONAL CHANGE

Compared to agriculture, medicine, and industry, the state of knowledge regarding educational change is immature. The field of educational innovations needs inquiry, as Miles (1964a) has pointed out. Particularly is the need great in reference to the processes that are involved. Organized activities are being planned and carried out at several centers for the purpose of learning about change in education.[1] Analogues are available from the other fields named above that are suggestive but nevertheless require application and testing in

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[1] The Cooperative Project in Educational Development is an example. The following description is from the SEC Newsletter, Vol. I, No. 7, May 1966, The Ohio State University, Columbus, Ohio.

> COPED is a three year project supported by a grant from the U. S. Office of Education. It is being carried out by eight colleges and universities working in five regions with coordination by the National Training Laboratories of the National Education Association. Included are: The University of Michigan in the Detroit region; The University of Chicago in the Chicago region; Temple University in the Philadelphia region; Boston University and Lesley Teachers College in the Boston region; and, Columbia Teachers College, Yeshiva University and Newark State Teachers College in the New York region. Approximately five school systems are collaborating with the university teams in each region. The University of Wisconsin R & D

education. It is probably fair and accurate, however, to describe the field of educational change at present as needing conjectures.

This view of the field does not prejudice it or its development on a scientific basis. Popper (1962) has defined science in terms of conjectures and refutations. In the absence of empirical results, conjecturing may be the appropriate starting point. Conjectures may take the form of ideas and concepts that together provide a conceptual framework. The ideas that are stated below represent a preliminary effort in giving conceptual definition to the field of educational change. The conjectures not only conceptually map the field but may also provide guidance to investigators as they plan and carry out projects in connection with Models for Effecting Planned Educational Change.

In order to yield knowledge, conjectures must be empirically confronted with the appropriate phenomena. Testable hypotheses can be formulated in terms of the stated conjectures. The criterion of testability requires propositions that relate to events descriptive of educational change. To be useful in conducting investigations, the hypotheses will need to be sufficiently definitive so that they can either be confirmed or refuted when they are put to an empirical test. This is the essence of formulating knowledge regarding educational change.

There are nine major ideas which, in the opinion of the author, are presently useful for conjecturing about educational change in schools. The major ideas are formulated in the following statements of conjecture.

I. CHANGE AND IMPROVEMENT IN EDUCATION. A change in education or the introduction of an innovation into a system does not <u>per se</u> represent an improvement.

In considering and planning for the improvement of schools, the obvious first principle is to recognize that a process of change is involved. It is not to be assumed, however, that all changes will be improvements. For this reason, research and development, testing, and evaluation activities are critical in the present stage of development of education in the United States. In this connection, the functions of the Research and Instruction (R & I Units) described in an earlier article on Project MODELS may be judged as having central import. It is anticipated that R & I Units, operating at a sufficient level of effectiveness, will contribute to testing innovations within the school system itself. The operation of the Units will provide critical information which may be used by school officials in judging whether or not a proposed innovation is better than its <u>status quo</u> analogue.

In the past few years, many innovations have been made in education. During the same period, there has been little evaluation of the changes. After reviewing the chapters of the book he edited, Miles (1964b) concluded, "Educational innovations are almost <u>never</u> evaluated on a systematic basis" (p. 657). Perhaps there has been little change in schools thus far that has made a significant difference in their effectiveness. The Research and Instruction Units, placed as they are in schools and linked to a Research and Development Center or some other appropriate department of a university, promise to provide an instrumentality for developing and testing innovations. A plausible case may be made—but the tasks involved are tremendous—that every school in the United States should in time be operating Research and Instruction Units or some other instrumentality for testing and evaluation. Such a strategy institutionalized through cooperative school and university programs would quickly contribute to the development of the body of knowledge required for making substantial educational improvements.

There is another proposition of very deep significance that throws light on the difference between education change and educational improvement. Educational progress or improvement depends upon better answers for the questions of education than those now being advanced and validated. The key questions of educational practice are perennial; they persist through years, changing their form but not their essential characteristics. They all involve, as Jensen (1965) has demonstrated, sociopsychological phenomena. These phenomena can be investigated by the methods of science, and better understanding of these phenomena can thereby be generated.

But education questions are what Adler (1965) describes as mixed questions, having two com-

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Center was involved in early development of COPED and has become informally affiliated.

Another project investigating change processes has been initiated by the Center for the Advanced Study of Educational Administration at the University of Oregon. The proceedings of a seminar are reported in Carlson, R. O., Gallaher, A., Jr., Miles, M. B., Pellegrin, R. J., & Rogers, E. M., <u>Change processes in the public schools</u>. Eugene, Oregon: The Center for the Advanced Study of Educational Administration, 1965.

ponents. One component can be dealt with through what we ordinarily define as scientific investigation, such as studies of the conditions of learning and experimentation in the schools. The needs of this first component may be satisfactorily handled through the observation of phenomena and the other methods of science.

The second component is non-investigational in character. It carries the burden of normative concerns. It is involved with the questions of what ought to be. For education, it is the question of what educators and other citizens should seek through the schools. What should be the purposes and the guiding values of the schools? The second component of the mixed educational question needs inquiry into values and valuing, an inquiry that requires the competency of the philosopher.

It is conceivable that an investigator may learn factually about the change process and about specific innovations that could be introduced into schools. But the question of value would still remain unanswered. Results may be determined factually when innovations are put to work in the school. Consequences that flow from the installation and use may be accurately and fully described. By what criteria, or standards of value, however, are the results to be judged good or not good, satisfactory or not satisfactory?

Ultimately, any concern in education is a value question. Therefore, educational change should always be guided by well-grounded value considerations. Only when this condition is satisfied can we have the assurance that we are talking about educational improvement and not limiting ourselves to talking about educational change. It is worth emphasizing again that there cannot be improvement without change. Perhaps, in order to produce just one substantial improvement in education many different changes will have to be tried and evaluated. The testing must be done against the criteria that educators judge to be relevant. Such criteria are the ultimate grounds for refuting or confirming a change or innovation. These criteria cannot be validated by empirical investigation, although empirical generalizations may throw light on the nature of the needed criteria. They must be nurtured in the profession and public arena through the discussion of education, its values and policies, by philosophers and concerned citizens. Thus studies in educational policy can yield criteria for judging the difference between a change and an improvement in education.

2. EDUCATION AS CAUSED BY SEVERAL FACTORS. An educational phenomenon is always the result of a simultaneous operation of several factors that work either together or in opposition, maintaining a balance and determining the level of effect.

As an example, the level of educational opportunities offered the children attending a particular school is determined by several factors. Some of the factors may be (1) the degree to which teachers are socially accepted by parents, (2) the salaries paid the school personnel, (3) the professional preparation of teachers and administrators, (4) the procedures used in teaching children, (5) the character of the curriculum in terms of appropriate ideas and skills, and (6) the extent of teachers' opportunity to participate in making policies that influence the quality of instructional programs.

At any given time, these and other factors are in a state of balance that determines the level of educational opportunity that the children enjoy. Some factors may tend to elevate the level but, for a given time, their actual force may be offset by factors that tend to depress the level. For example, relatively high salaries may be offset by low teacher morale so that the level of educational opportunity is, in effect, held down. In changing the level of educational opportunity, the depressing factors need to be decreased in force or the elevating factors need to be strengthened. For educational opportunity to be stabilized at a high level, the depressing factors must be decreased permanently, while presently elevating factors must be made lastingly greater.

The paradigm which is illustrated in Figure 1, Field Force Analysis, was developed by the late Kurt Lewin. Working independently, Myrdal (1944) developed a comparable approach to diagnosing social phenomena. The paradigm provides a diagnostic approach for the practitioner to use in dealing with the change process. A particular educational condition in the school (instruction in a subject, rate of innovation, teacher turnover, etc.), which may become the target for planned change, needs first to be viewed diagnostically. The theory can be stated as follows: a condition for which a modification is to be attempted is the result of the simultaneous operation of several factors or forces. The condition and its causes represent a dialetic in reality. The situation may be described as a tension system. In planning a change, therefore, the first step in diagnosis is the identifying and defining of the several forces that determine the present condition.

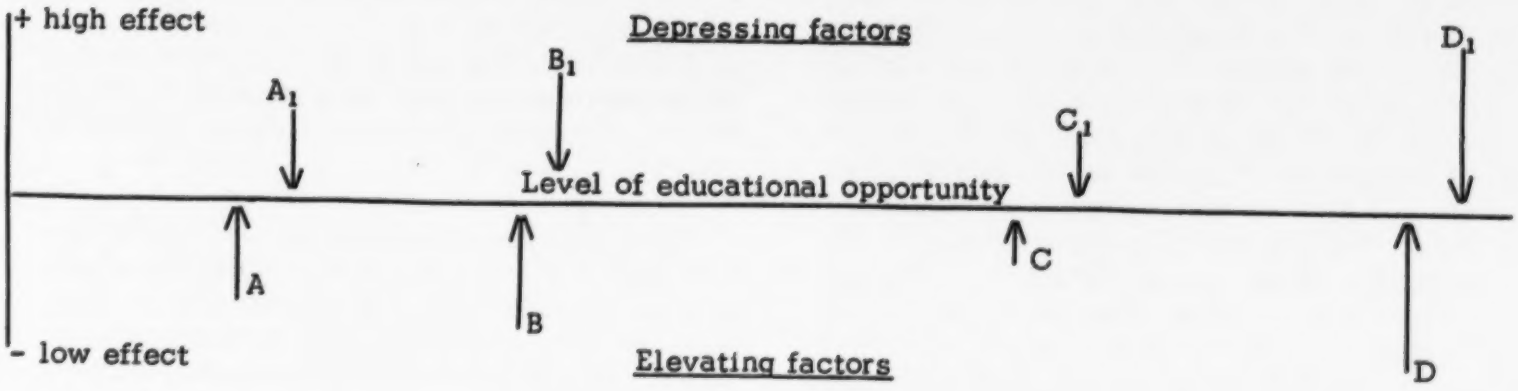


Fig. 1. Field Force Analysis.

Educational practitioners actively involved in a situation being diagnosed are able to describe the more obvious factors. Specialists in the behavioral sciences and education can help in making a diagnosis. Data can be gathered for clarifying and evaluating elements that are used in making a tentative or preliminary diagnosis, thus adding validity to the diagnosis.

A diagnosis will reveal that some of the factors tend to change the condition in a desirable direction, but for the time their potential force is counter-balanced by factors that tend to depress the condition being analyzed for constructive change. For the desired change to take place, certain actions may be prescribed. The depressing factors may need to be decreased in force, or the elevating factors may be judged in need of strengthening. Forces or factors may also be eliminated or added to change a condition.

The conjecture is that this method of diagnosis is a useful concept for analyzing a school situation in which change is desired. It is conceptually sound for two reasons. It avoids the error of a single-factor analysis of a problem; its use will keep attention playing over an educational situation to detect several factors. Also, by focusing attention upon a number of factors, it gives a practitioner several points at which he may intervene in his attempt to produce a change. This line of conjecturing, however, needs to be developed and tested empirically in the reality of school situations, with practitioners and investigators sharing the undertaking.

3. MULTIPLE AND CONCURRENTLY APPLIED CHANGE EFFORTS ARE DESIRED. Since a variable in an educational situation results from the action of many factors, an effective strategy of change involves plural actions that are directed simultaneously toward several of those factors.

This correlate to the last conjecture has to do with the change effort and the way in which it is directed. In order to induce the largest possible accumulation of change effects, acts of intervention need to be directed simultaneously toward selected factors among the several which initially determine the condition to be changed. No one factor in the school system is the crucial one whose alteration will permanently change or improve the system. Through diagnosis it may be determined, however, that certain factors at a particular time are more important than others and are, therefore, the strategic ones.

When an approach is made through the concurrent modification of several factors, the possibility of permanent improvement is increased. A cumulative or snowball effect can be expected through interaction between the factors (Myrdal, 1944). Dealing with a single factor at a time is not likely to lead to a stabilized improvement.

The practical application of this principle is, when possible, the use of a multi-factor approach in a program of school improvement. Specially designed teacher education, the introduction of new materials, redesigns for the curriculum, new scheduling arrangements, organization and modified roles for teachers and administrators, and other innovations would desirably be introduced in appropriate concert with one another.

The more promising planned change will, therefore, embrace a set of actions, each calculated to induce change in a particular factor of the system. The likelihood is thereby created that the change will spread into the school system beyond its point of initiation. A change that is developed and tested in one school, for example, may, with some coordinating help through a communication mechanism, spread to other schools in the system.

Another advantage is the greater chance that a self-perpetuating and undesirable cycle of influence holding down level of effect will be disturbed. Its sustaining factors are more likely to be modified through the use of a strategy of change that embraces several elements. Such a vicious cycle of influence is operating when low teacher morale, for example, conditions low student morale, with the result that student behavior and performance lowers still further the level of teacher effectiveness.

Through multiple and concurrently applied change efforts, a climate for change may develop and the tradition of adaptiveness may grow. The conjecture to be developed and tested is that the diagnosing and planning of actions that take into account several factors stand a chance of producing a critical mass of change influence in a system. The production of many effects, with most being good, will lead not only to more change but also to an increase in the probability of a more stable condition of improvement in the school system.

4. THE SCHOOL AS AN ORGANIZATION. Since actions producing change necessarily involve different roles and various positions in the school system, the legitimatizing of authority and power must be appropriately related to the phases of the change process.

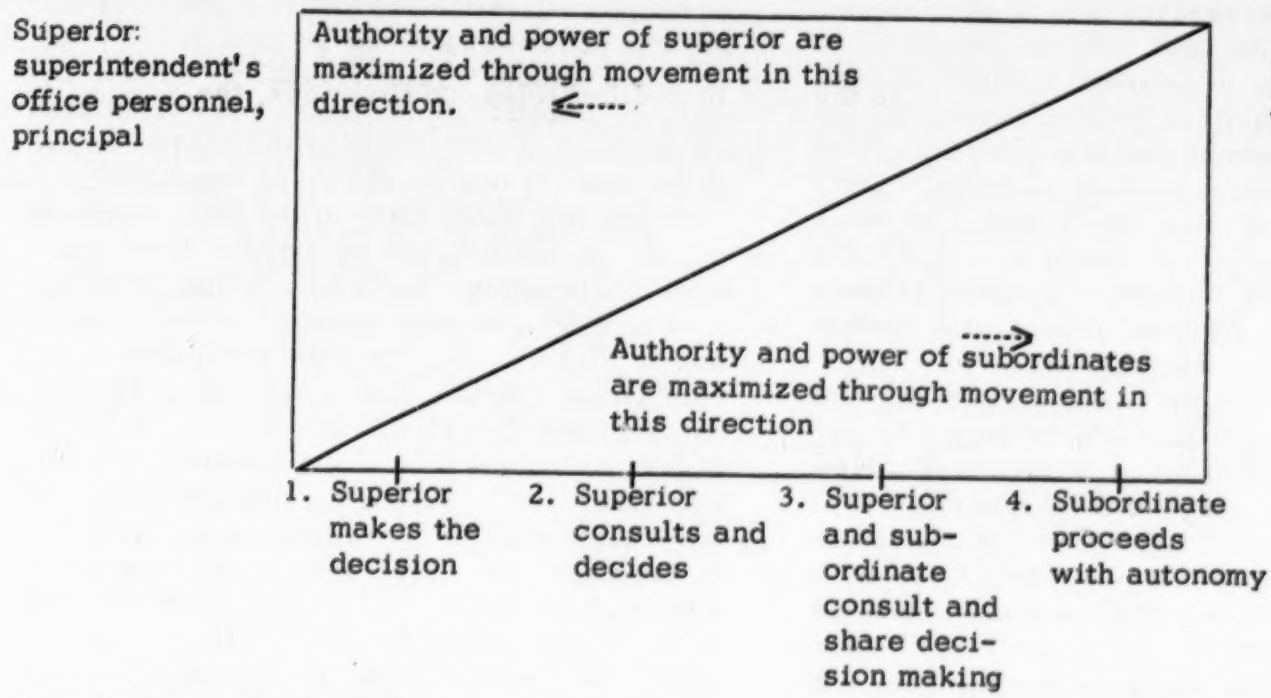
Jensen and Goodson (1956) have elaborated upon the proposition that a school system has the properties of a formal organization. Among its formal aspects, an important one in respect to the change process is that it is a network of roles that express expectations about the rights and obligations of the persons who occupy the roles such as students, teachers, service personnel, administrators, public representatives, and sometimes parents (Jensen & Goodson, 1956, pp. 10-11). These roles relate to one another in a hierarchy. They are distributed in a power and authority structure. It may be conjectured that this structure has a relationship with a change process that operates in a school system.

The process of change embraces a series of action-stages. Guba and Clark (1965) have defined the stages as research, development, diffusion, adoption, and institutionalization. Research formulates and creates new knowledge. Development involves invention and the design of products based upon knowledge. Diffusion consists of dissemination for creating awareness and interest among practitioners. Also, demonstration providing practitioners with an opportunity to examine and to assess operational properties of a product is a phase of diffusion. Adoption involves the trial of the product in a school system. Finally, through institutionalization, the product is assimilated as an integral component of the system and in time loses its distinction as an innovation.

There are three alternative organizational modes, as determined by authority and power relations between roles and positions, by which a school system may operate in making decisions. (1) A system may be operated in a decentralized manner. Decision making is allocated to the individual school and is highly distributed to the role of the teacher. Central administration is supportive and adaptive. In the main it serves a coordinating function. It is not directive. (2) A system may operate in a centralized mode. All critical decisions are made in the superintendent's office. Directives are communicated to school principals and teachers. (3) A third alternative is a combination of centralization and decentralization with a good deal of middle ground devoted to consultation. Some types of decisions may be made centrally and others may be made on a decentralized basis. Or the system may shift from one mode to the other as the needs of the organization change or as particular problems of change may dictate. A role of the superintendent's office is then that of diagnosing system needs and planning strategies with appropriate attention and weighting to elements of the decentralized and the centralized modes.

The conjecture may be formulated that some phases of the change process require the centralized mode, while others require the decentralized approach. The decision to initiate changes in a school system may require the use of central authority and power. The phases of the change process that are represented in the stages of trial, installation, and institutionalization require decentralized decision making in which teachers and principals are highly involved. Certainly, the assimilation of an innovation into the operating norms of the school must involve authority and power relations which maximize the autonomy of teachers and support their professional judgment.

As a further elaboration upon the basic proposition that is being conjectured about, there are four elementary modes of operation between a superior and a subordinate which represent the managing of power and authority relations. The locale of decision-making shifts from one to another mode. The modes may be placed in Positions 1–4 on a continuum from authority being maximized for the superior (superintendent's office, Position 1) to authority and power


Superior: superintendent's office personnel, principal
Authority and power of superior are maximized through movement in this direction.
Subordinate: principal and teachers
Authority and power of subordinates are maximized through movement in this direction
1. Superior makes the decision
2. Superior consults and decides
3. Superior and subordinate consult and share decision making
4. Subordinate proceeds with autonomy

Centralized authority and power required for initiating and establishing early stages of the change process—organizing for research and development, benefiting from diffusion through school system personnel participating in dissemination and demonstration activities

Decentralized authority and power required for trying and evaluating innovations, installing them in a school system, and finally the institutionalization of a change.

Fig. 2. Superior-subordinate relations regarding authority and power in planning and managing the change process.

being maximized for the subordinate group (teachers, Position 4) as illustrated in Figure 2.

At Position 1, the superior makes the decision and communicates its content to the subordinates who are expected to act accordingly. At Position 2, the superior consults with the subordinates but reserves the responsibility for making a decision. At Position 3, the superior consults with the subordinates and shares the decision making with them. At Position 4, the superior authorizes the subordinates to proceed in a relatively autonomous manner in managing the change process and supports them by providing resources. Undoubtedly, all four positions on the authority continuum have relevance to stages of the change process.

This analysis provides still further differentiation upon the decentralization-centralization dichotomy model described above. It provides a large area for consultation and cooperation which are crucial in determining the success with which a school system is able to handle the problems of the change process. A similar and probably useful analysis could be made of external relations of authority and power, as between the system and the local community or between the superintendent's office and the school committee.

The role of the superintendent's office is of utmost importance in determining authority and power relations in relation to making changes in the school system. Carlson's (1964) study has demonstrated the importance of the superintendency. To the superintendent's office falls the task of diagnosing relations that are appropriate for a particular stage of the change process.[2] Legitimatizing power and authority in the roles, and the position to which they are attached in the organization (principal, teacher, consultant, researcher, etc.), is an important element. Appropriate and timely legitimatizing is a key to the change process and to assuring the sequence of stages necessary for a change attempt to be realized.

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[2] The change-agent competencies that are appropriate to the role of the superintendent's office in this connection have been formulated and stated in School-Community Development Study: A 5-year cooperative program in school administration. Columbus, Ohio: College of Education, The Ohio State University, 1951. Pp. 13-17.

This area of inquiry into relationships between a change and authority and power in the school is in great need of conjecturing and empirical testing. It appears to be a very important area in which knowledge is needed. It has high relevance to the responsibilities of the practitioner in changing and improving education.

5. THE REALITY OF HUMAN FUNCTIONING AND RELATIONS. An educational system involves the reality of human functioning and relations that is required to change if educational improvement is to be achieved.

The social reality of a school system is determined in the main by the people who are held in an interdependent relationship with one another, as children, teachers, administrators, parents, and other adults may lay claim to belonging together in a school system. What they know of one another, how they feel toward one another, and how they act toward one another—are all facets of the social reality which must be examined and, when appropriate, be modified before a school system can undergo a significant change.

The actions necessary for making changes have to be directed toward several factors of human relations that may be judged to be critical. These have to do, for example, with the control an individual or group has over the communication of ideas. Also, the accessibility of individuals and groups holding authority and power in the social hierarchy may prove to be important when consultation is needed or when one person needs to attempt to persuade another. The degree of openness between a principal and teachers who advocate a change in the school curriculum, or the capacity of a school faculty to listen to a central committee on experimentation, may be critical for the process of change. Until the negative influence that may be associated with such factors is corrected through improved human relations, an effort to produce change in the school system is likely to be frustrated.

Therefore, as innovations are introduced and as efforts are made to maintain them and to facilitate their spread from one school to another within a system, human factors will need to be taken into account. An important aspect is the participation of teachers and administrators in roles and structures. Before significant changes in the operation of a school can be brought about, it is likely that structures and roles will need to be developed that may represent significant changes and differences over prevailing structures and roles. After the invention of modified roles and structures, the preparation of personnel to function in them becomes a consideration of crucial importance. An idea or instructional technology always has its counterpart in a person functioning in a role or situation. The introduction and maintenance of a new instructional approach or teaching technique or the establishment of a new expectation for the role of the learner are basically determined by human functioning and relations. Any innovation, even one involving primarily physical technology, implies an appropriate change in the human counterpart and make-up of a unit of organization. In the last analysis, it is the person functioning in a role and relating to other persons who occupy roles in a coordinated system that determines the efficiency of the school's program. The re-education of teachers and administrators in skills, values, and the behavior appropriate to an innovation is a necessary condition for making changes and improving school practice.

It may be conjectured that there are three dimensions involved in an educational change problem: (1) the complexity of the innovation to be introduced, developed, and maintained; (2) the scope of the structure and the complexity of roles articulated through the structure; and (3) the re-education of the personnel that will occupy and function in the roles. The relationships between the dimensions are illustrated in Figure 3. Two of these dimensions

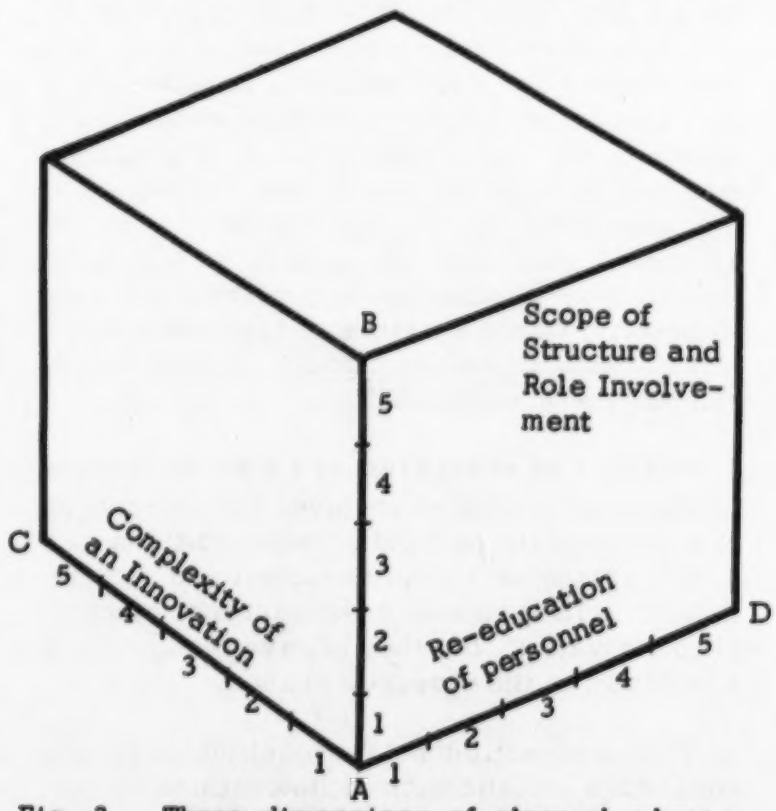

Fig. 3. Three dimensions of planned educational change.

involve the factors of human functioning and relations. The more simple the innovation, the less complex is the structure and role dimension and the less re-education required. On the other hand, a complex innovation requires a complex role structure and probably more re-education of the personnel.

AB represents the scope of structure and role involvement. Position 1 may be represented by one teacher in a self-contained classroom making an innovation. Position 5, much more complex than 1, may be represented by the following: (1) change problems studied by a structure such as a system committee that is designed to increase the interdependence between a school committee, the superintendent's office, school principals, and teachers in planning strategies for improvement; or (2) an instructional program in which the roles of special teachers are vertically and horizontally related to provide a program for the education of a group of children for several years. (This could be the structure of a school.)

AC represents the complexity of an innovation. Position 1 is represented by substitution of a new textbook for a currently used one. Position 5, the more complex innovation, may be represented by (1) new teaching materials and procedures, organized in a system and designed to be used diagnostically and in different combinations for accomplishing a teaching objective; or (2) teacher materials based upon a radically different and unique conception of subject matter. (The new mathematics or science a few years ago illustrates this point.)

AD represents the re-education of personnel involved in a change. Position 1 is represented by a teacher receiving information about an innovation and institutionalizing it very quickly into her professional activities. Position 5, the more complex, is represented by the re-education that may be required of a teacher moving from a suburban school to one in the inner-city, where a system of teaching requiring changes in values, goals, sensitivities, and human-relations skills may be used.

6. NECESSITY OF ADAPTATION AS A MODE OF CHANGING. Educational changing involves the indigenous and necessarily particularized conditions of a school system or school considering a change; these conditions may even warrant the rejection of an innovation, but they always require some adaptation of the proposed change.

This proposition sets a requirement for the adaptative modification of innovations so that they take on an indigenous quality. If a proposed change is to be assimilated into a school system, it needs to accommodate, at least to some extent, the views, ideas, and norms of the professional staff, students, and professional and lay leaders of the school receiving it. Therefore, the form in which an innovation is transferred from one school to another or from a research institution to a school must be adaptive. Attention must be given to its form and operational requirements in preparing it to achieve a tradition of fitness in the receiving school. When this criterion is not satisfied, an innovation will function at best in a mechanical manner, if it has any chance at all to function. It will be superficial and will not "grow into the fabric of the school." As a result of the lack of assimilation, the change will likely be pushed out of the school at the first opportunity by rejecting professional and student personnel.

This adaptive requirement of an innovation is related to the phenomenon of resistance to change. It is the property of a school system, as of other systems, to maintain its own integrity. Therefore, anyone attempting to function as a change-agent needs to be aware of the potential of resistance and to give attention to its diagnosis. Sometimes a main and necessary aspect of an adaptation may consist mostly of making clear that the proposed innovation does not threaten the core values and the fundamental goals of the school system. In any case, the introduction of change into a school system cannot be a coercive process but must be planned and directed in a sensitive and adaptive manner that takes into account several factors of integrity: the persons occupying roles in the system, the functions that are served by the system, and the community to which the system is related. This means that introduction of change by an outside agent, such as a university or state department of public instruction, needs to become a genuinely cooperative undertaking involving teachers and administrators of the school system.

There is a danger, however, that one can speculate about in recognizing the indigenous characteristics of the receiving institution. The indigenous factors must not be allowed to perpetuate an organizational rigidity and a resistance to a change on the basis of unwarranted views, either of the needs of the system to change or the characteristics of a proposed innovation. The prevention of organizational rigidity is a responsibility of local leadership. It may be a problem that needs to be viewed diagnostically in its own right. The natural and healthy resistance that may be at first mo-

bilized at the suggestion of an innovation must be worked through and resolved. If this is done in such a way that the proposed innovation is recognized to have an integrity that has come out of its earlier testing in another environment, and that it has a potential for yielding an improvement in the receiving system, then the innovation stands a chance of being assimilated and will likely enjoy the opportunity of functioning effectively.

It is conceivable that an innovation may overadapt to the indigenous conditions in the school system in the process of being installed. Then its essential elements will be dissipated, and in time the innovation will lose its character and become ineffective. When this happens no real change will have occurred in the school system, and consequently the improvement that the innovation offered will not become realized.

7. THE CRITERION OF PARTLY-AUTONOMOUS AND CONTINUING ADAPTABILITY. For an educational system to improve consistently over a long period of time, it is required that the organization for attending to change, as well as specific innovation themselves, acquire capacities for irreversibility, self-regeneration, and self-correction.

In the past, innovations that have been introduced into the school systems have not always become stabilized, and it has sometimes been the fate of a very good innovation to go out of operation in time. The change process has been, therefore, a reversible one. In response to the cult of keeping-up-to-date, change in education, in some instances at least, could be accurately described as moving through a wide pendulum-type swing. School systems may go from one innovation to another. In a short period of time, Innovation A may be set aside and Innovation B substituted for it, without sufficient development of the potentials of Innovation A.

In addition to the introduction of change, attention needs to be given to the maintenance and development of innovations once they are introduced into the school system. Probably the best assurance of irreversibility and of maturation of an innovation is provided by the introduction of a new structure with new roles, with a dedication on the part of officials to give the new structure a sufficient tenure for realizing its promise or for demonstrating its essential weakness. This requires experimentation on the part of the school system. It means, also, that teachers and administrators need help from research and development consultants who have the knowledge necessary for maintaining and developing the innovation. Also, innovations need to have built into them a capacity for regeneration and continued growth which allows for self-correction when other conditions change in the school system or in the supporting community.

The Research and Instruction Unit represents an innovation that has the property of a new structure with new roles and functions being delegated to the structure. It is a new organizational entity. The R & I Unit establishes new relationships and new expectations. It translates new objectives and techniques into roles. Personnel need to be specially prepared to perform the new roles effectively. If the R & I Unit and similar instrumentalities can meet the first test of irreversibility, they will then have the opportunity to demonstrate whether or not they have the viability that can be gained through self-regeneration and self-correction.

Probably some sort of organization for attending to change through incorporating research and development functions into the school system is necessary for sufficient autonomy and continued adaptation of a school system over a period of time. It is only as the functions that are now performed mainly by universities and research and development agencies, and to some extent by state departments of public instruction, become built into the school system that it will be able to meet the criterion of being partly autonomous in continuing adaptability. It is not to be expected that school systems will ever become completely independent of research activities of the scholarly community, as well as other sectors of the community that make legitimate demands upon the schools. It is desirable, however, in a period of intense change, that the schools become much more autonomous, and acquire the capacity of continuing adaptability to a much greater extent than they have been able to demonstrate in the past. This criterion by which change in a school system should be ultimately judged is the standard that has been eloquently set forth by John W. Gardner (1964) in his book Self-Renewal.

8. THE CYCLICAL SEQUENCING OF CRITICAL PROCESSES. An effective general plan for introducing and maintaining change needs to be flexible and to be executed through a series of recurring cycles of diagnosis, goal-setting, planning, acting, and evaluation.

Figure 4 shows the essential elements of a model for educational development that represents the cyclical sequencing of critical pro-

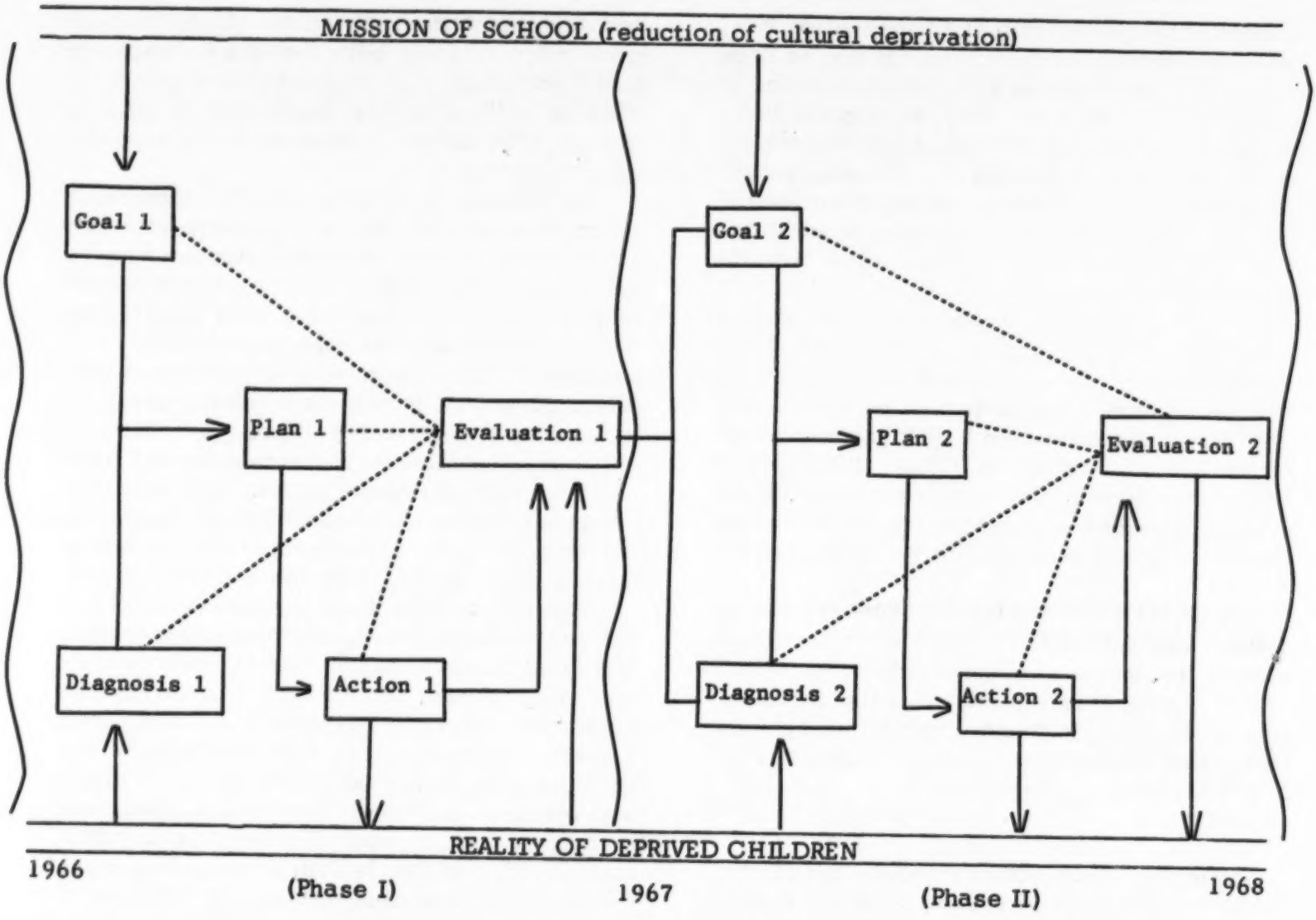

Fig. 4. Model for educational development.

cesses. The model relates the mission and the reality of a school system with the critical processes connecting them, enabling the mission to give direction to changing the school's reality. The mission is represented by the broad functions and responsibilities of the school in society and in the community that it serves. The mission needs to be clarified and legitimized through appropriate participation of representatives of the public in consultation with professional educators.

A goal has characteristics that the mission does not have. To be effective in directing the work of a school, an educational goal needs to be formulated in specific and concrete terms. A goal has a property of quantification regarding what, when, who, and how much. The numbers of students to be served, characteristics of students, and the time that the goal is going to be in force before it is reviewed are some of the terms for specifying a teaching goal. The innovation to be introduced and the schedule for its study and initial installation are aspects of an organization change-goal that need to be specified in expressing the mission of the school to improve itself. A goal needs to be consistent with the mission of the school; it represents a concrete and specific expression of the mission.

Diagnosis deals with the reality that must be changed if the goal is to be accomplished in the future. Diagnosis attempts to formulate the essential factors that are operating in the reality and to indicate the forces that have to be dealt with. In the example that is given in the figure, the reality of deprived children has become a target for change and improvement. This means that deprivation has to be defined, and it must be documented as the definition clarifies the elements of the reality. Its dynamics or field-force analysis must be known for its diagnosis to be complete.

Plan 1 is a procedure or method—simple or complex in that it includes several subprocedures—calculated to take the diagnosis into account and enable the school to realize the stated goal. The plan is then put into action by the assigned staff, the action being

essentially a concrete intervention or series of interventions involving the reality. The evaluation step represents the review of the action and its effectiveness, the adequacy of the diagnosis, the adequacy of the plan, and the appropriateness of the goal. These processes of diagnosis, goal-setting, making plans, and taking action are revised in light of the evaluation, and revised versions are then conducted.

The degree of flexibility that an organization manifests in its operation is determined by the length of time that is required for one cycle. Modular scheduling, for example, in programming students in high school is a device for processing data regarding student progress and important elements of a program over a relatively short period of time. This contrasts with stable and permanent programming on the basis of a duration of a semester. The change process in a school system, perhaps, requires annual or semi-annual review. Some efforts may even require weekly or monthly review. Many of the processes of school organization have been stabilized on a basis of a full-year cycle which may be too long for maximum viability of a school system.

It is conjectured that a continuous and circular step-by-step development, as represented by the elements of the model, will most likely produce the results of a steady and directed change process and progress in a school system. Circular sequencing contrasts with linear sequencing in that feedback and corrective loops are more easily generated in the recurring-cycle design. It may be conjectured that improvement is related to the extent that recurring cycles of analysis, deciding, acting, and fact-finding for results are used in the management of basic processes of administration and development, for example, budget-planning and allocation of resources, defining and solving problems of the system, communication, decision making, educating teachers, developing new organizational structures, utilization of new teaching materials and technology, and other such basic processes.

In a period that calls for intensive educational change—and with the prospect of at least another decade of vigorous educational improvement continuing to be demanded by our national effort—it is of critical importance, as was pointed out in the last section, that the schools become self-renewing. It is conjectured that the circular sequencing of critical processes, institutionalized as an innovation in its own right, would provide for the necessary flexibility and self-correction of the change process. As a result, the school system would acquire more autonomy and strength for continuous renewal and self-regeneration.

9. EDUCATIONAL IMPROVEMENT REQUIRES A PARTNERSHIP OF INSTITUTIONS. Educational change sufficient to meet today's demands for improvement requires a system of institutions that mutually influence one another as they perform centrally specialized, but still somewhat mixed, functions in the following areas: (1) research and development, (2) cooperative field-testing and evaluation, (3) installation of new practices, (4) preparing educational personnel, and (5) planning and managing an instructional program.

At the present time, these functions are allocated to school systems, universities, state departments of public instruction, and other agencies. Central responsibility for a particular function needs to be allocated to a particular institution. The nature of the change process is such, however, that each institution needs to perform a mixture of all of the functions. A sufficient institutional overlap is necessary to provide for all the needs of the stages of change formulated in the earlier analysis. This overlap may be described as linkages by which various institutions concerned with the improvement of education may be coordinated. Shared roles, structures, and personnel are necessary.

The need for institutional linkage is being recognized organizationally through the Regional Laboratories. There is beginning to emerge a network of institutions. There is the prospect that many institutions linked together through Regional Laboratories will mutually influence one another as they perform their major functions of research and development, field-testing and evaluation, and installing new practices in schools. As a component of the partnership, it is exceedingly important that institutional attention be given to the preparation of the needed educational personnel, not only for planning and managing instructional programs for children and adults in schools but also for providing the necessary continuous research and development.

PROPOSED STUDY OF CHANGE

The above nine major ideas may be viewed as a preliminary effort to conceptualize the process of educational change. Based upon these ideas, four main objectives of Models for Effecting Planned Educational Change have been outlined:

1. To develop a taxonomy for educational innovations and for relating innovations to the change requirements of the school as an organization.
2. To provide descriptive documentation that may be analyzed for insights into problems and ways of meeting problems that arise in connection with establishing and operating new structures in school systems.
3. To ascertain the effects of laboratory training in human relations and problem solving upon a school system committee attempting to function as a change agent.
4. To ascertain the effects of consultation and the forms in which consultation may be provided a school system change-agent team when an outside agency (such as the Research and Development Center and the State Department of Public Instruction) endeavors to aid a team in planning and executing its change attempts.

The conduct of the study is seen as proceeding in a three-step sequence of selecting change-agent teams; supporting, training, and observing the teams; and preparing for autonomy of the new structures that may be created. These steps are further described below.

The first step is the selection of change-agent teams of five or six persons with various combinations of positions represented. For a particular team, the roles may be school committee member, superintendent, principal, supervisor, teacher, director of innovation or research, and director of elementary or secondary education. Exploratory discussions have been conducted with representatives in the Wisconsin school systems cooperating with the Research and Development Center regarding the study of educational change in their own school systems. School system participation will fall into three categories: (1) three or more school systems that organize teams to give attention to change with which the Center staff would work in introducing and studying change, (2) those that are kept informed as the project develops over the next two years, and (3) those that serve as controls to systems in which change-agent teams are working and as sources of data related to the variables being studied.

Information will be collected regarding the change-agent teams. Training and consultation will be provided them initially by the Center staff in defining change-objectives within their respective organizations and in planning and carrying out actions calculated to accomplish their change objectives. The staff of the study will function in a role of trainer-consultant in attempting to help teams in planning their change efforts. A laboratory training program provided the members of the teams giving attention to change in their respective systems will give attention to the following:

a. The understanding of the school as an organization
b. What is known about the change process
c. Sensitivity of the person in interpersonal and group relations
d. Problem-solving skills of team members
e. Diagnostic and intervention skills appropriate to the role of the human relations consultant-trainer
f. The designing of roles and structures within the school
g. Organizational diagnosis and evaluation
h. Data-gathering techniques for testing hypotheses

The second step is concerned with giving support to the teams through consultation and training as needed over a period of a year or eighteen months in conducting their planned change efforts in the school system. Simultaneously, researchers of the Center will study the processes and outcomes of these efforts.

The third step will start after the assessment of change-efforts and will be concerned with exploring and demonstrating ways of stabilizing new structures in the school system for hopefully assuring future autonomous and self-renewing efforts by the organization. This step is to demonstrate ways of withdrawing support of the Research and Development Center and State Department of Public Instruction without decreasing the forward movement of the organizations in improving the quality of educational practice.

A FURTHER PHILOSOPHICAL CONSIDERATION

When we are dealing with problems of educational change, even though the forefront of the effort may be investigative, there always lies in the background the normative concerns that can only be settled by philosophical inquiry. As indicated above, any educational question is ultimately a value question and educational change should always be guided by well-grounded value considerations.

As has also been suggested above, human cooperative is very central to educational change. The scientist, for example, is working with the practitioner of education, and also hopefully with the philosopher. Their respective and appropriate activities and concerns

are different. But in an effort of planned change, outlooks of the scientist, the practitioner, and the value scholar must be involved. Therefore, not only must educational change be based upon facts and experimentation and scientific principles, but it must also be grounded in ethics. There are norms by which people not only ought to organize joint enterprise, but are required to organize a joint enterprise in my view if it is to be successful. These norms are the ethics of collaboration and consultation. They are the orientations of problem-solving and task-doing, rather than prestige-gaining and power-seeking of one over the other. Appropriate integrative behavior is a requirement on the part of the scientist, the practitioner, and others who join in the process of educational change.

In dealing with the normative problem of educational change, the words of Hoffer (1966), appearing in a recent issue of Saturday Review, are appropriate. He raises a relevant question and then gives his observation which implies, for me, a wise caution for any effort in planned educational change.

> Why should power corrupt the intellectual more than it does other types of humanity? One of the reasons is to be found in the assumption that education readies a person for the task of reforming and reshaping humanity—that it equips him to act as an engineer of souls and a manufacturer of desirable human attributes. Hence, when power gives him the freedom to act, the intellectual will be inclined to deal with humanity as with material that can be molded and processed (p. 74).[3]

The investigator today is in a powerful role in educational change, and rightfully so. According to my judgment, however, the philosopher is also needed. Moreover, the practitioner stands always as the ultimate target of the change process. His resistances, when and if they become activated, may truly be the end of the line for educational change in our day. In any event a keen sense of humility must pervade the efforts of the behavioral scientist in investigating change if he is going to prove helpful to the practitioner in producing changes in schools.

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